

3. A Description of the German River-Frog (*Rana esculenta*, var. *ridibunda*, Pallas). By G. A. BOULENGER, F.Z.S.

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(Plate XL.)

When I received a year ago a large number of *Rana esculenta* from Berlin, I was so struck by the differences they presented that I had no hesitation in regarding them as of two distinct races or subspecies, and I bestowed upon the one which was new to me, and to which attention had previously been called by Prof. Pflüger<sup>1</sup>, the name of *R. fortis*. As I had not then sufficient material to establish a comparison with all the forms which had already been named by various authors, this seemed to me the best course, my object being to draw immediate attention to the remarkable fact of two distinct closely allied forms occurring in the same locality, reserving for a future occasion an investigation into the chaotic synonymy. I have since constantly been amassing material; and I think I may flatter myself on having now before me the finest and largest series of specimens of *R. esculenta* with accurate localities which has ever been brought together. Unfortunately, the more specimens I examine, the more difficult the subject appears; and I should not think of attempting at present a general revision of the races of this widely distributed species. It is evident that under the name *Rana esculenta* a number of forms are thrown together, the extremes of which are as distinct as many we are accustomed to regard as valid species; but as they are linked together by numerous insensible gradations, it is best to regard them as subspecies.

The great number of specimens, both alive and in spirits, which have lately passed through my hands, have more and more strengthened my belief in the constancy of the characters upon which I have based the distinction of *R. fortis* and *R. esculenta*; but they have also convinced me that the name *R. fortis* should be cancelled in favour of the name *R. ridibunda*, Pallas.

My object at present being merely to give a detailed account of the recently discovered German Frog, I will leave aside all further material in order to avoid confusion, and all that is said of *R. esculenta* for comparison applies only to German specimens. The following description is based on the examination of about 130 specimens of *R. ridibunda*, of which six are from Prague, the rest from Berlin.

*RANA ESCULENTA*, var. *RIDIBUNDA*.

*Rana ridibunda*, Pallas, Reise, i. p. 458 (1771).

*Rana cachinnans*, Pallas, Zoogr. Ross.-As. iii. p. 7, pl. i. figs. 1, 2 (1831); Eichwald, Faun. Casp.-Cauc. p. 126, pl. xxx. (1841).

<sup>1</sup> Arch. f. Physiol. xxix. 1882, p. 67.





*Rana esculenta*, var., Pflüger, Arch. f. Phys. xxix. p. 67 (1882), and xxxii. p. 522 (1883).

*Rana fortis*, Boulenger, The Zoologist, xlii. p. 220 (1884).

*Diagnosis*.—A large, strongly built form, with long hind limbs, the *tibia proportionately longer* than in the typical form; *inner metatarsal tubercle relatively small, elliptical, feebly prominent, not compressed*, measuring 2 to  $4\frac{1}{2}$  millim. in specimens in which the inner toe measures 9 to 15 millim. Olive, bronzy olive, or dull green above, with blackish-olive spots; usually a pale green vertebral band; no yellow on any part of the body; *hinder side of thighs olive, or greenish white marbled with dark olive*. Vocal sacs grey.

*Dimensions.*

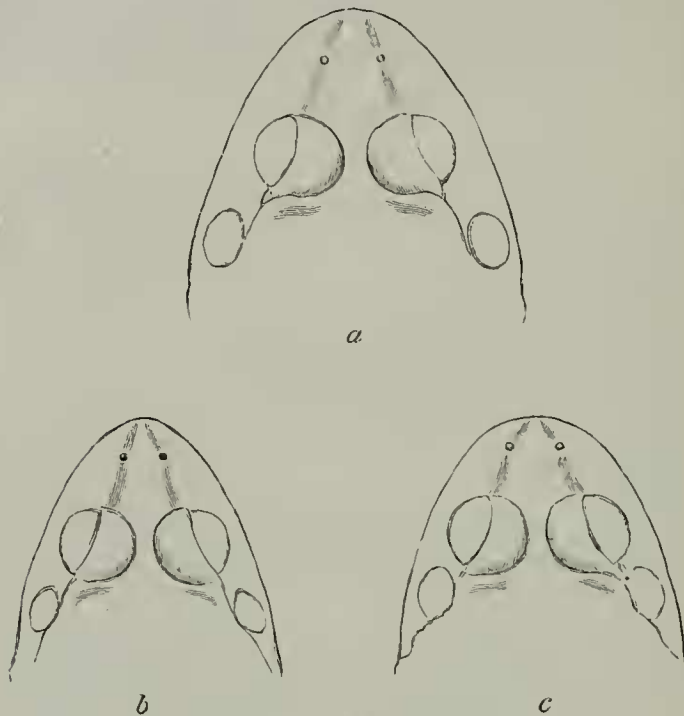
	♂. millim.	♀. millim.
From snout to vent . . . . .	98	104
Length of head . . . . .	30	32
Width of head . . . . .	32	36
Diameter of the eye . . . . .	8	8
Interorbital space . . . . .	3	3
From the eye to the nostril . . . . .	6	7
From the eye to the tip of the snout . . . . .	13	15
Diameter of the tympanum . . . . .	6	7
Fore limb . . . . .	48	49
Hind limb . . . . .	135	160
Tibia . . . . .	42	50
Foot (from outer metatarsal tubercle) . . . . .	44	51
Inner toe (from inner metatarsal tubercle) . . . . .	12	15
Inner metatarsal tubercle . . . . .	4	4.5

*Description*.—The snout is normally broadly rounded, its length measuring half its width (from a transverse line passing on the anterior border of the orbits); in the extremes it measures two fifths or three fifths its width, as seen in the accompanying figures (Fig. 1, p. 668, where *a* and *c* represent the two extreme forms, fig. *b* the normal). The canthi rostrales are obtuse, and the loreal regions very oblique. The nostril is nearly equidistant from the eye and the end of the snout. The interorbital space is very narrow, measuring less than half the width of the upper eyelid, and usually more or less distinctly grooved longitudinally. The diameter of the tympanum equals half, or nearly half, that of the orbit.

The hind limb being stretched forwards, the tibio-tarsal articulation reaches the eye or halfway between the latter and the end of the snout; there is no considerable difference in respect to the sexes. The legs or tibiæ being folded against the thighs and maintained at right angles to the vertebral column, their extremities overlap; to ascertain this character with precision, it is necessary not to force the tibial extremities together, but to allow due space for the fleshy parts. In the typical *R. esculenta*, the extremities of the tibia either abut or are separated by a short interspace. This of course

implies a greater length of the tibia proportionally to the femur in *R. ridibunda*. The foot is fully webbed; its length, from the outer metatarsal tubercle to the end of the fourth toe, equals half the distance from the vent to the nostrils or the tip of the snout, or a little more. The subarticular tubercles of the toes as well as of the fingers are rather small and feebly prominent. The inner metatarsal tubercle is elliptical, blunt, much less prominent than in the typical

Fig. 1.

Heads of *Rana esculenta*.

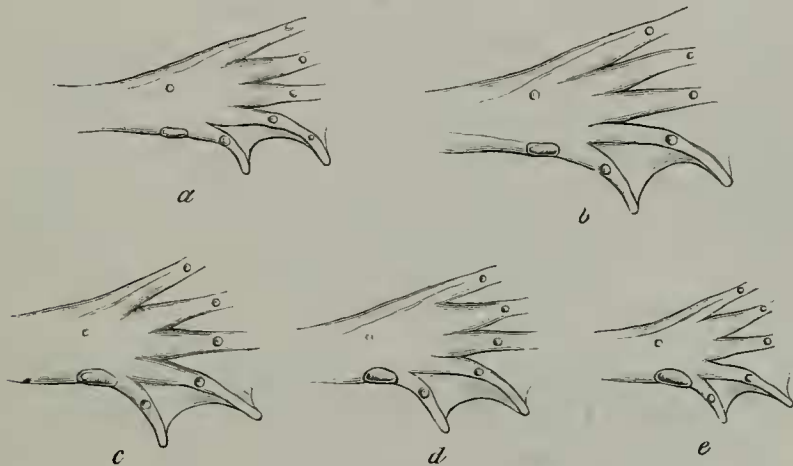
*R. esculenta*; it is also smaller compared with the inner toe, its length seldom equalling, and never exceeding, its distance from the subarticular tubercle of that toe. In the typical form the metatarsal tubercle is always more prominent, more or less strongly compressed, frequently crescentic in shape; its length at least equals, and usually considerably exceeds, its distance from the subarticular tubercle. However, the length of the metatarsal tubercle is, like all characters, subject to a certain amount of variation; the smaller variety of the typical *R. esculenta*, which occurs along the Rhine, has usually the tubercle larger than in the larger variety of the same form as occurring in Berlin and elsewhere, and to which Rösel's *kana viridis* belongs. It is a fact that a graduated series may be formed from the *R. ridibunda* with very small tubercle to the *R. esculenta* with very large tubercle, and such a series is represented in the accompanying figures (Fig. 2, p. 669).

The skin of the back and hind limbs is more or less warty, seldom



nearly smooth. The glandular lateral fold is moderately prominent and constantly broad, as broad as or even broader than the upper eyelid. The coloration is far less variable than in the typical *R. esculenta*. In the normal condition the ground colour of the upper parts is olive or bronzy-olive, with the vertebral band, the fore limbs, and the sides of the head and body pale green or pale olive. But, of course, through the play of the chromatophores, the same individual may pass successively from a very light to a very dark hue, according to its being placed in very dry or very moist surroundings. In specimens long kept in the water, the colour turns to a very dark bronze-olive, almost blackish, in which case the

Fig. 2.



a, b. *R. ridibunda*, Berlin; c. *R. esculenta*, Berlin; d. *R. esculenta*, Basle; e. *R. esculenta*, Düsseldorf.

normally darker markings may assume a brighter greenish tint; but if these markings are examined with a magnifying glass, they are seen to be black beautifully powdered with gold. The vertebral band varies considerably in width, and may be absent altogether. The glandular lateral folds are usually not conspicuously lighter-coloured, though sometimes metallic bronzy. The spots on the back and flanks are more or less numerous, and the hind limbs are transversely banded, but these markings are of a blackish-olive or bronzy-brown, and never of an intense black as is frequently the case in *R. esculenta*. The dorsal spots sometimes form pretty regular longitudinal series, but are never confluent into longitudinal bands. A dark canthal and supratemporal streak is usually present, and the latter portion sometimes expands into a regular temporal spot. The edge of the upper lip is either spotless or with a series of blackish spots which very seldom unite to form a labial streak. The cross bands on the legs may be very irregular or absent. The hinder side of the thighs, *i. e.* that part which is concealed by the legs when the animal is at rest, are whitish or pale greenish marbled with dark olive or bronzy, or of the latter colour with or without small light